



Shifting the Project Management Paradigm for Exploration

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Sources

- ◆ **Faster Better Cheaper**
 - Howard McCurdy, 2001, Johns-Hopkins University Press
- ◆ **The Secret of Apollo**
 - Stephen B. Johnson, 2002, Johns-Hopkins University Press
- ◆ **A Complexity-Based Risk Assessment of Low-Cost Planetary Missions: When is a Mission Too Fast and Too Cheap?"**
 - David Bearden, 2000, Fourth IAA International Conference on Low-Cost Planetary Missions, The Aerospace Corporation



PAL Ramp Foam Loss (STS-114)





Gravity Probe B





NASA Management Models

- ◆ Systems Management
- ◆ Faster, Better, Cheaper



Systems Management

- ◆ **Definition:**
 - A set of organizational structures and processes used to develop a novel but **dependable** technological artifact within a **predictable** budget₁.

1. Johnson, The Secret of Apollo



Characteristics of Systems Management

- ◆ Rigor
- ◆ Predictability of Cost & Schedule
- ◆ Organizational Innovation
- ◆ Bureaucracy
- ◆ Transfer of risk to the government
- ◆ High Cost



Faster, Better, Cheaper

◆ Definition:

- A management system based upon the principle that one can simultaneously improve schedule, cost, and reliability

◆ Approach:

- Smaller, lighter components
- Simpler management



FBC Track Record

♦ 10 successes

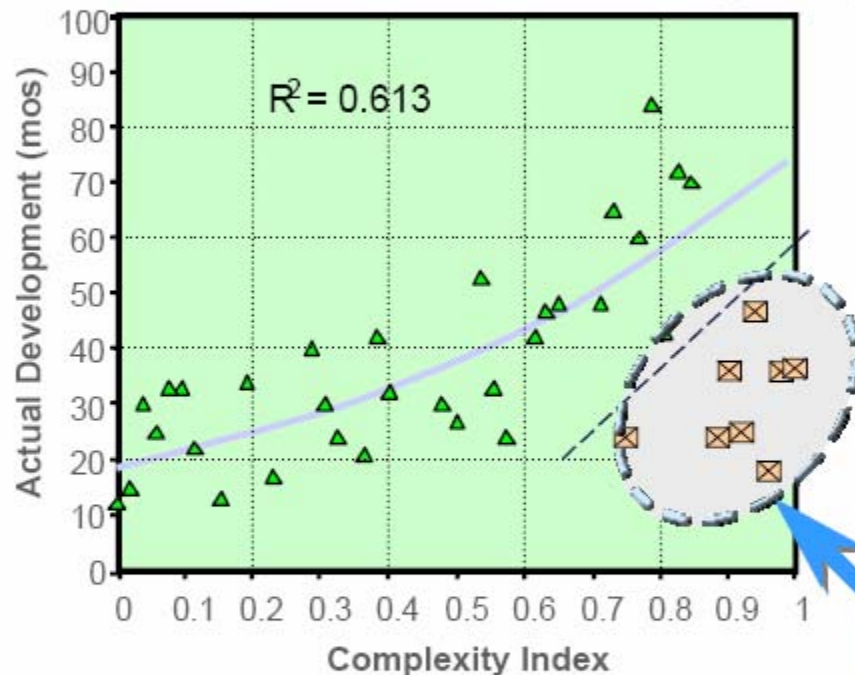
- Mars Pathfinder, Stardust, Lunar Prospector, etc.

♦ 6 Failures

- Mars Climate Observer, Mars Polar Lander, WIRE, Lewis & Clark, Deep Space 2

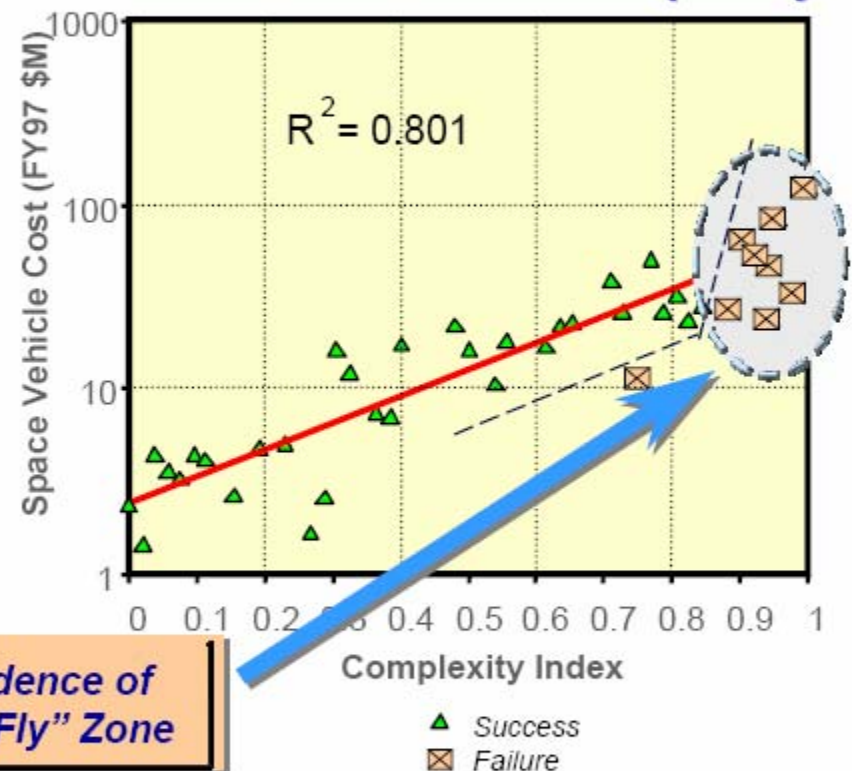
Faster, Better, Cheaper – “Pick Two”

Schedule as Function of Complexity



SOURCE: D. Bearden, The Aerospace Corporation.

Cost as Function of Complexity



**Evidence of
“No Fly” Zone**

*Pushing Cost and Schedule Risk Too Far
Poses Unacceptably High Risk*



Closing thoughts

- ◆ **Geopolitical factors have a surprising influence on management methods**
- ◆ **For Exploration, system complexity demands the rigor of systems management techniques**
- ◆ **The FBC management system does have attractive features such as decision efficiency and aggressive adoption of technology**
- ◆ **The charge to Exploration is to improve decision-making quality and rate and drive toward technology innovation without sacrificing the rigor of systems management.**